

Application No.: 09/436,158
Attorney Docket: AMKOR-019RCE

Amendments to the Claims:

1 – 12. (Cancelled)

13. (Previously Amended) A semiconductor package, comprising:

a metal lead frame, including a plurality of elongate leads arrayed around a central region thereof, each lead having an outer end portion extending away from the central region, an inner end portion extending toward the central region, and a middle portion extending between the outer and inner end portions, the middle portion being of a lead width and having a lower surface which defines a land;

a spatulate locking pad in the outer end portion of each lead and having a locking pad width which exceeds the lead width;

a spatulate wire bonding pad in the inner end portion of each lead and having a bonding pad width which exceeds the lead width; and

a die pad attached to the lead frame in the central region thereof and adjacent to the inner end portions of the leads, the die pad having an upper surface and a lower surface, the lower surface having a central portion and a recessed shoulder extending around the central portion.

14. (Original) The semiconductor package of Claim 13, wherein the die pad is attached to the frame or to at least one of the leads by at least one tie-bar.

15. (Previously Amended) The semiconductor package of Claim 13, wherein the middle portion of each of the leads is about 0.18 mm wide, and wherein the leads have a pitch of about 0.5 mm.

16. (Original) The semiconductor package of Claim 15, wherein each of the bonding pads is about 0.254 mm wide.

17. (Original) The semiconductor package of Claim 13, wherein the lands are rectangular.

18. (Original) The semiconductor package of Claim 13, further comprising:

a semiconductor die attached to the upper surface of the die pad;

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a plurality of conductive wires bonded at opposite ends to pads on a top surface of the die and selected ones of the bonding pads on the leads, respectively; and,

a body of an insulative plastic molded over the die, the die pad, and the leads such that the plastic body surrounds the locking pads, the bonding pads and the recessed shoulder on the lower surface of the die pad and interlocks with them, and such that the lands and the central portion of the lower surface of the die pad are exposed through a lowers surface thereof.

19. (Original) The semiconductor package of Claim 13, wherein the leadframe comprises an alloy of copper, aluminum, or iron and nickel.

20. (Original) The semiconductor package of Claim 18, wherein the insulative plastic of the body comprises an epoxy resin.

21. (Previously Amended) A lead frame for a semiconductor package, comprising:

a plurality of elongate metal leads arrayed around a central region, each lead having an outer end portion extending away from the central region, an inner end portion extending toward the central region, and a middle portion extending between the outer and inner end portions, the middle portion being of a lead width and having a lower surface which defines a land;

a spatulate pad formed into each of the inner and outer end portions of each lead, each of the spatulate pads of each lead having a pad width which exceeds the lead width; and,

a disposable frame connected to the leads.

22. (Previously Amended) The lead frame of Claim 21, further comprising a die pad disposed in the central region and adjacent the inner end portions of the leads, the die pad having a recessed shoulder extending around a periphery of a lower surface thereof.

23. (Previously Amended) A semiconductor package of a type that includes a ductile metal lead frame having a plurality of elongate leads radiating out from a central die pad, a semiconductor die mounted on the pad, a plurality of wire bonds connecting the die to the leads, and a protective plastic body molded over the leads, the pad, the die, and the wire bonds, the improvement in combination therewith comprising:

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a spatulate wire bonding pad formed into an inner end portion of each lead and adjacent to the die pad, the wire bonding pad having a bonding pad width; and,

a spatulate locking pad formed into an outer end portion of each lead and having a locking pad width;

the bonding pad width and the locking pad width each exceeding a lead width of a middle portion of each lead extending between the inner and outer end portions thereof.

24. (Previously Presented) The semiconductor package of Claim 23, wherein the wire bonds are connected to the wire bonding pads.

25. (Previously Amended) The semiconductor package of Claim 23, wherein the middle portion of each lead has a lower surface defining a land which extends between the spatulate wire bonding and locking pads thereof, each land having a lower surface exposed through a lower surface of the plastic body.

26. (Previously Presented) The semiconductor package of Claim 23, further comprising a recessed shoulder formed into a periphery of a lower surface of the die pad such that a central portion of the lower surface inside of the shoulder is exposed through a lower surface of the plastic body.

27. (Previously Presented) The semiconductor package of Claim 23, wherein the leads, the die pad, and the spatulate pads have coplanar upper surfaces.

28. (Previously Amended) A semiconductor package of a type that includes a ductile metal lead frame having a plurality of elongate leads radiating out from a central die pad, a semiconductor die mounted on the pad, a plurality of wire bonds connecting the die to the leads, and a protective plastic body molded over the leads, the pad, the die, and the wire bonds, the improvement in combination therewith comprising:

a spatulate locking pad formed into an outer end portion of each lead and having a locking pad width which exceeds a lead width of a middle portion of each lead.

29. (Cancelled)

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30. (Previously Amended) The semiconductor package of Claim 28, further comprising:

means formed into an inner end portion of each lead and adjacent to the die pad for increasing the wire bonding area on the lead.

31. (Previously Amended) The semiconductor package of Claim 30, wherein the means for increasing the wire bonding area comprises a spatulate wire bonding pad formed into the inner end portion of the lead and having a bonding pad width exceeding the lead width.

32. (Previously Presented) The semiconductor package of Claim 28, further comprising means formed into a lower surface of the die pad for resisting penetration of moisture into the package along the die pad.

33. (Previously Presented) The semiconductor package of Claim 32, wherein the means for resisting penetration of moisture comprises a recessed shoulder formed into the lower surface of the die pad around a periphery thereof, a middle portion of the lower surface being exposed through a lower surface of the plastic body.

34. (Previously Presented) The semiconductor package of Claim 13, wherein at least one of the spatulate locking pads, the spatulate wire bonding pads, and the recessed shoulder is formed by a metal-displacement process.

35. (Previously Presented) The semiconductor package of Claim 18, wherein the insulative plastic body underfills each of the spatulate pads.

36. (Previously Presented) The lead frame of Claim 21, wherein the spatulate pads are formed by a metal-displacement process.

37. (Currently Amended) A semiconductor package of a type that includes a metal lead frame having a plurality of elongate leads radiating out from a central region thereof, the leads having inner end portions adjacent to the central region, outer end portions distal therefrom, and middle portions extending between the inner and outer end portions, a semiconductor die mounted in the central region, and a protective plastic body molded over the leads and the die, the improvement in combination therewith comprising at least one spatulate pad formed in the outer end portion of at least one of the leads and having a pad

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width which exceeds a lead width of each of the middle portions of the leads, the at least one spatulate pad being underfilled by the plastic body.

38. (Cancelled)

39. (Previously Presented) The semiconductor package of Claim 38, wherein the at least one spatulate pad is formed adjacent to a side wall of the plastic body.

40. (Currently Amended) The semiconductor package of Claim 37, wherein the further comprising at least one spatulate pad [[is]] formed in the inner end portion of the at least one lead.

41. (Previously Presented) The semiconductor package of Claim 37, wherein at least some of the leads have a plurality of the spatulate pads formed therein.

42. (Previously Presented) The semiconductor package of Claim 37, further comprising a die pad disposed in the central region, the die pad having opposite first and second surfaces, the semiconductor die being mounted on the first surface of the die pad, the second surface of the die pad including a recessed shoulder extending fully around a periphery thereof, and the second surface of the die pad being exposed through and flush with an exterior surface of the plastic body such that the recessed shoulder is underfilled by the plastic body.

43. (Previously Presented) The semiconductor package of Claim 41, wherein the at least some leads have a surface exposed through and flush with an exterior surface of the plastic body.

44. (Previously Presented) The semiconductor package of Claim 37, wherein the at least one spatulate pad is formed by a metal-displacement process.

45. (Previously Presented) The semiconductor package of Claim 43, further comprising a die pad in the central region and upon which the die is mounted, wherein the die pad includes a recessed shoulder extending fully around a periphery of a surface thereof, and wherein a surface of the die pad within the recessed shoulder is exposed in a plane of an exterior surface of the plastic body, the recessed shoulder being underfilled by the plastic body.